

B7
Cm
vehicle; a value indicating an environment of the vehicle; and values indicating operating states of manually operable members provided on the vehicle.--

REMARKS

Claims 1-21 and 24-57 are pending. Claims 2-21, 24-36, 43, 53 and 55 have been withdrawn from consideration. By this Amendment the specification, claims 1, 24-28, 30-32 and 41 are amended, claims 22 and 23 are canceled and claim 57 is added. Reconsideration based on the above amendments and following remarks is respectfully requested.

The attached Appendix includes marked-up copies of each rewritten paragraph (37 C.F.R. §1.121(b)(1)(iii)) and claim (37 C.F.R. §1.121(c)(1)(ii)).

Applicants appreciate the courtesy extended to Applicants' representative at the January 6, personal interview. The substance of the discussion held, is incorporated into the following remarks.

I. The Claims Satisfy the Requirements of 35 U.S.C. §112, second paragraph

The Office Action rejects claims 1, 37-42 and 44-51 under 35 U.S.C. §112, second paragraph. Claims 1 and 41 have been amended to obviate the rejection.

II. The Claims Define Patentable Subject Matter

The Office Action rejects claims 1, 22, 23, 37-40, 44 and 56 under 35 U.S.C. §102(3) over U.S. Patent No. 6,315,371 to Wachi et al. This rejection is respectfully traversed.

A braking pressure control apparatus, as recited in the invention of claim 1, provides an improvement over a known apparatus including a first hydraulic pressure source (31) including a power-operated pressurizing device (12) to pressurize a fluid, a second hydraulic pressure source (14) operable by a manually operable brake operating member (10), to pressurize a fluid to a pressure higher than a level corresponding to an operating force of the brake operating member, and a switching device (30, 152, 162) for selectively placing the braking system in a first operating state in which a brake cylinder is operated with the

braking system in a first operating state in which a brake cylinder is operated with the pressurized fluid delivered from the first hydraulic pressure source and a second operating state in which the brake cylinder is operated with the pressurized fluid delivered from the second hydraulic pressure source.

Specifically, the improvement is provided by at least one of (a) a change restricting device (32) operable upon a switching of the braking system between the first and second operating states by the switching device, to restrict a change of an operating state of the brake operating member and/or a change of the brake cylinder pressure, which would take place due to the switching between the two operating states, and (b) a switching control device (see e.g., 32: S51-S53 of Fig. 20: S55-S60 of Fig. 21: S71 and S72 of Fig. 22) operable to control the switching device on the basis of a running condition of a vehicle which has a wheel to be braked by the brake cylinder.

When the operating state is changed from the first state to the second state, for example, the recited change restricting device may be arranged to delay the moment of opening of master-cylinder shut-off valve 162 (SMCR), for reducing a pressure difference between front and rear brake cylinders (see e.g., page 118, lines 14-24; Figs. 4A-4D), and/or to hold open the simulator shut-off valve (158) for a suitable time after opening of the master-cylinder shut-off valve (152) so that the pressurized fluid is delivered from the stroke simulator (156) into the brake cylinder (20) or is discharged from the brake cylinder into the stroke simulator, as indicated in Figs. 6 and 7 and as described on pages 120-124 (page 121, lines 2-10, in particular), so as to prevent an undesirable "brake pedal sink" or "brake pedal kick-back" phenomenon (page 123, lines 6-13, and page 124, lines 1-5).

The recited switching control device may be arranged to select the second operating state when the ignition switch (232) is turned on while the vehicle is stationary (Fig. 20; page 170, lines 5-14), and select the first operating state when the running condition requires any

special braking control such as an anti-lock braking pressure control, a turning stability control, a regenerative or cooperative braking control, etc. (Fig. 22; page 176, lines 9-17).

Wachi discloses a braking system including a first hydraulic pressure source (13, 14) including a pump (14), and a second hydraulic pressure source including a master cylinder (3), and wherein the braking system is normally operated in a first operating state in which brake cylinder (9-11) is operated with pressurized fluid from the first hydraulic pressure source (col. 6, lines 13-56), and is operated in a second operating state in the event of a failure of the first hydraulic pressure source. In the second operating state, the brake cylinder (9-11) is operated with the pressurized fluid delivered from the second hydraulic pressure source (3), as noted by the Office Action and as described at col. 11, lines 16-25 with respect to the embodiment of Fig. 4.

However, Wachi does not address the problem which may take place upon switching of the braking system from the first operating state to the second operating state. Specifically, when the hydraulic pressure source used to operate the brake cylinder (9-11) is changed from the pump (14) to the master cylinder (3). The reference fails to teach a change restricting device as recited in claim 1, which is operable to control the switching device to select the first or second operating state on the basis of the vehicle running condition. The reference merely teaches switching the braking system from the first operating state (pump mode) to the second operating state (master-cylinder mode), in the event of some failure of the second hydraulic pressure source (13, 14a, 14b, 21).

The reference also fails to disclose a switching control device as recited in claim 1, which is operable to control the switching device on the basis of the vehicle running condition. In this respect, the term "running condition of a vehicle" recited in claim 1 or the term "running state" used in the specification (e.g., page 6, lines 19-20) should be distinguished from the term "a state" of the vehicle and the term "states indicating whether

elements of devices of the vehicle are normal or abnormal:, as clearly defined on page 6, lines 16-27. That is the "failure" of the motor 13, pumps 14a, 14b, or the controller 21 referred to at col. 11, lines 16-17 of Wachi should not be interpreted to be the running condition of the vehicle, according to the definition given on page 6, lines 16-27, and from page 48, line 7 through page 49, line 2, for example. Wachi does not disclose switching the braking system from the first operating state (pump mode) to the second operating state (master-cylinder mode) or vice versa, on the basis of the vehicle running condition as exemplified in the paragraph bridging pages 48 and 49, or on the basis of at least one value selected from the group recited in new dependent claim 57.

With respect to claim 56, claim 56 recites a pressure control device (30, 32) operable to control a fluid pressure of a hydraulically operated brake, by controlling the pressure of the fluid pressurizing by a power-operated hydraulic pressure source (31), on the basis of an operating amount of a manually operable brake operating member (10), and at least one of a rate of change of the operating amount and a derivative of the rate of change.

Wachi discloses a pedaling force detecting means (22) in Fig. 1, which is arranged to detect or obtain various values as discussed in detail at col. 5, lines 51-67. Applicant respectfully disagrees with the Office Action's assertion that Wachi discloses detecting a rate of change of pedal movement. The various values listed at col. 5, lines 51-67 never include a rate of change of the operating amount of the brake pedal (2) or a derivative of this rate.

The Office Action rejects claims 45-52 under 35 U.S.C. §103 over Wachi in view of U.S. Patent No. 6,158,825 to Schunck et al. This rejection is respectfully traversed.

Claims 45-51 depend from claim 1. As indicated above claim 1 defines patentable subject matter.

With respect to claim 52, claim 52 recites at least one first brake cylinder (20), at least one second brake cylinder (28), a first hydraulic pressure source (31) including a power-

operated pressurizing device (12) and a plurality of pressure control valve devices (30), a second hydraulic pressure source (14), and a cutting-off device (152, 162) including a first cut-off valve (152) corresponding to the at least one first brake cylinder and a second cut-off valve (162) corresponding to the at least one second brake cylinder. Wachi discloses in Fig. 4, at least one first brake cylinder (9, 10), at least one second brake cylinder (11, 12), a first hydraulic pressure source (13, 14a, 14b) including a power-operated pressurizing device (14a, 14b) a plurality of pressure control valve devices (26-29), a second hydraulic pressure source (3), and a cutting-off device including a first cut-off valve (19) and a second cut-off valve (20).

However, Wachi fails to disclose a diagnosing device (32) and a valve-device control device (32) as also recited in claim 52. While Wachi refers to a failure of the first hydraulic pressure source (12, 14a, 14b), the reference never shows a diagnosing device operable to diagnose each of the pressure control valve devices (26-29). Accordingly, Wachi fails to teach the valve-device control device operable when the diagnosing device determines that any of the pressure control valve devices (26-29) is abnormal. Wachi does not disclose any suggestion or motivation to provide the disclosed braking system with a valve-device control device as recited in the last paragraph of claim 52.

Schunck merely shows stroke simulator (125) and brake cylinder pressure sensors (151-154), which are not shown in Wachi, and fails to provide the deficiencies of Wachi.

Claim 1 is generic to all species. Therefore, because claim 1 contains allowable subject matter, claims 2-21, 24-36, 43 and 53-57 also contain allowable subject matter.

III. Conclusion

In view of the foregoing, Applicants submit that this application is in condition for allowance. Favorable reconsideration and prompt allowance are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the telephone number set forth below.

Respectfully submitted,



James A. Oliff
Registration No. 27,075

Michael Britton
Registration No. 47,260

JAO:MQB/tea

Attachment:
Appendix

Date: draft

OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, Virginia 22320
Telephone: (703) 836-6400

<p>DEPOSIT ACCOUNT USE AUTHORIZATION Please grant any extension necessary for entry; Charge any fee due to our Deposit Account No. 15-0461</p>

APPENDIX

Changes to Specification:

Page 114, line 24-page 116, line 7:

The opening actions of the master-cylinder shut-off 25 valves 152, 162 are controlled according to a master-cylinder shut-off valve control routine illustrated in the flow chart of Fig. 3. This control routine is repeatedly executed while the braking system is placed in the first operating state. The routine is initiated with step S11 to determine whether the first switch flag is set at "1". As described above, this first switching flag is set to "1" when the first switching condition is satisfied, and is held at "1" until the braking system has been switched from the first operating state to the second operating state. That is, the first switching flag is set at "1" before the second operating state has been established. If the first switching flag is set at "1", an affirmative decision (YES) is obtained in step S11, and the control flow goes to step S12 to determine whether an SMCF switching flag is set at "1". This SMCF switching flag is set to "1" when the master-cylinder shut-off valve 152 (SMCF) corresponding to the front wheels 16 has been commanded to be opened, and is reset to "0" when the braking system has been switched to the second operating state. When step S12 is implemented for the first time, the SMCF switching flag is set at "0", that is, a negative decision (NO) is obtained in step S12, and the control flow goes to step S13 to determine whether the absolute value of a difference between the fluid pressure P_{WCF} in the front wheel brake cylinders 20 and the fluid pressure P_{MC} in the pressurizing chamber 86 is equal to or higher than a predetermined threshold P_{th1} . When a negative decision (NO) is obtained in step S13, the control flow goes to step S14 in which the master-cylinder shut-off valves 152, 163 corresponding to the front and rear wheels 16, 24 are switched from the closed state to the open state, and the first switching flag is reset to "0", so that the switching to the second operating state is completed. When the absolute value of the pressure difference of the wheel

brake cylinders 20 and the second hydraulic pressure source 14 is considerably small, no problem will arise even if the two master-cylinder shut-off valves 152, 162 are simultaneously opened. In step S14, the simulator shut-off valve 158 is closed, and the front and rear communicating valves 154, 164 are opened.

Page 154, lines 4-14:

In the second operating state, the simulator shut-off valve 158 is held in the closed state, so that the stroke simulator 156 is disconnected from the second hydraulic pressure source 14, so as to prevent an unnecessary consumption by the stroke simulator 156 of the pressurized fluid delivered from the second hydraulic pressure source 14. On the other hand, the solenoid coil 188 of each linear valve device 30 is held in the de-energized state, so that the pressure-increasing linear valve 172 and the pressure-reducing linear valve 176 ~~ear~~are both held in the closed state, whereby the wheel brake cylinders 20, 28 are disconnected from the pump device 12.

Changes to Claims:

Claims 22 and 23 are canceled.

Claim 57 is added.

The following is a marked-up version of the amended claims:

1. (Amended) A braking pressure control apparatus for controlling a pressure of a working fluid in a brake cylinder of a hydraulically operated brake in a hydraulically operated braking system, said braking pressure control apparatus comprising:

a first hydraulic pressure source including a power-operated pressurizing device for pressurizing the fluid;

a second hydraulic pressure source operable by an operation of a manually operable brake operating member, to pressurize the fluid to a pressure higher than a level corresponding to an operating force acting on said brake operating member;

a switching device for selectively placing the braking system in a first operating state in which said brake cylinder is operated with the pressurized fluid delivered from said first hydraulic pressure source while said brake cylinder is disconnected from said second hydraulic pressure source, and a second operating state in which said brake cylinder is operated with the pressurized fluid delivered from said second hydraulic pressure source while said brake cylinder is disconnected from said first hydraulic pressure source; and

at least one of (a) a change restricting ~~device~~means operable upon a switching of the braking system between said first and second operating states by said switching device, to restrict at least one of a change of an operating state of said brake operating member and a change of the fluid pressure in said brake cylinder, which changes take place due to said switching, and (b) a switching control device operable to control said switching device on the basis of a running condition of a vehicle which has a wheel to be braked by said hydraulically operated brake.

24. (Amended) A braking pressure control apparatus according to claim 221, ~~further comprising~~wherein said change restricting device comprises a pressure-difference reducing device operable to reduce a difference between the fluid pressure in said brake cylinder and the pressure of the fluid pressurized by said second hydraulic pressure source, when the braking system is switched between said first and second operating states by said switching device.

25. (Amended) A braking pressure control apparatus according to claim 221, ~~further comprising~~wherein said change restricting device comprises a flow-amount reducing device operable to reduce amounts of flow of the fluid between said second hydraulic pressure source and said brake cylinder when the braking system is switched between said first and second operating states by said switching device.

26. (Amended) A braking pressure control apparatus according to claim 22~~1~~, ~~further comprising~~ wherein said change restricting device comprises a change-rate restricting device for restricting a rate of change of the fluid pressure in said brake cylinder when the braking system is switched between said first and second operating states by said switching device.

27. (Amended) A braking pressure control apparatus according to claim 22~~1~~, wherein said switching control device commands said switching device ~~is operated to effect~~ at least a switching operation of the braking system from said first operating state to said second operating state, while said brake operating member is not in operation.

28. (Amended) A braking pressure control apparatus according to claim 22~~1~~, ~~further comprising~~ wherein said change restricting device comprises a control-state-change restricting device operable to restrict a change in a control characteristic of the fluid pressure in said brake cylinder when the braking system is switched between said first and second operating states by said switching device.

30. A braking pressure control apparatus according to claim 22, further comprising an influence reducing device operable to reduce an influence of the switching of the braking system by said switching device on an operating state of said brake operating member, which influence is unexpected to an operator of the brake operating member.

31. (Amended) A braking pressure control apparatus according to claim 22~~1~~, ~~further comprising~~ wherein said change restricting device comprises a modified-pressure-control device operable to control the fluid pressure in said brake cylinder during the switching of the braking system by said switching device, in a manner different from normal manners in which the fluid pressure in the brake cylinder is controlled in said first and second operating states.

32. (Amended) A braking pressure control apparatus according to claim 221, ~~further comprising~~ wherein said change restricting device comprises a forecasting-type change restricting device operable to initiate an operation to restrict at least one of a change of an operating state of said brake operating member and a change of the fluid pressure in said brake cylinder, upon detection of a symptom indicating a high degree of probability that the braking system is switched between said first and second operating states by said switching device.

41. (Twice Amended) A braking pressure control apparatus according to claim 33, wherein said hydraulically operated brake is provided for braking a wheel of a vehicle, and said switching control device ~~commands~~ is operable when said vehicle is permitted to run after having been inhibited from running to command said switching device to establish said second state, when said vehicle which has been inhibited from running is permitted to run.